

REMARKS

Reconsideration and allowance are respectfully requested.

Applicant appreciates the allowance of claims 13-15.

Allowance of claims 1-12 also is requested.

Claims 1 to 12 are patentable over Krasij (US Patent 5,264,299).

Claim 1 generally describes a membrane-electrode unit assembly "MEA" (8, 4a, 4b) and a bipolar plate (1) of a fuel cell as component of a fuel cell stack. The MEA comprises a polymer electrolyte membrane (8) and a gas diffusion layer (4a, 4b) resting in the assembly on the membrane with the exception of the membrane periphery. The bipolar plate (1) rests against the side of the gas diffusion layer opposite the membrane and protrudes over the periphery of the gas diffusion layer while forming a circumferential marginal volume zone that is defined at the top, inner and bottom sides by the bipolar plate (1), the gas diffusion layer (4a, 4b) and the membrane (8). Krasij does not describe nor teach each and every claimed element.

In Fig. 1 of Krasij, backing plates 11 and 12 consist of porous graphite and the ends of these plates, i.e. 17 and 18, are impregnated by an initially flowable but then solidified material. Thereby, these marginal portions or frame portions 17 and 18 are no longer porous but are impermeable for gas.

The situation is similar for the porous support plates 22 and 23 which extend as far as the circumference of plates 11 and 12; in the marginal frame portion an initially flowable material

is caused to penetrate into and completely fill the pores of these support plate edge regions; further, in Fig. 1, this curable material fills the gap existing between the support plates 22 and 23 outside of the membrane 21 (column 5 lines 27 to 40).

The impregnated edge portions of the support plates 22,23 and of the backing plates 11, 12 are surface-bonded to each other by a bonding rum (column 6 bottom, column 7 top). Thus, the bipolar plate does not protrude over the periphery of the gas diffusion (support) layer and does not form a circumferential marginal volume zone that is defined at the top, inner and bottom sides by the bipolar plate, the gas diffusion layer and the membrane; since such a zone does not exist, it obviously is not filled with the cured adhesive all the way to its defining faces.

In contrast, as specifically pointed out in claim 1, there is a circumferential marginal volume zone on the bipolar plate 1 that is filled with a cured adhesive. Claim 1 also defines that the cured adhesive is filled all the way to its defining faces in a gap-free and gas-tight manner.

The situation is similar with reference to Fig. 2 of Krasij. It is assumed that reference numerals 24'a and 24'b show the wrong elements in Fig. 2 and should rather indicate the upper and lower parts of element 24', as can be concluded from the text at the bottom of column 5. Also here, there is no marginal zone and what is filled are the pores of the porous plates. Since the membrane extends in between the edge regions of the support

plates to such an extent as to be at least flush, there is no marginal volume zone at all, to be filled with the cured adhesive. Therefore, claim 1 is patentable over Krasij. Claim 1 is not anticipated by Krasij.

Claims 2-12 depend from claim 1 and include all of the limitations of claim 1, and are not anticipated by Krasij. Claims 1 to 7 comprise claim 1 by reference and thus are also patentable at least due to the features mentioned in claim 1. Claims 8 to 12 also refer to the volume zone which is filled with the curable adhesive, and thus also are not anticipated.

In addition, claim 2 further points out that the hydrogen side of the bipolar plate is glued together with the anode side of the MEA. That structure is not found in Krasij.

Claim 3 distinguishes the invention from Krasij in the same manner as claim 1, and further points out that the adhesive penetrates into the gas diffusion layer .2 mm to 1 mm. The criticality of that feature is that the adhesive penetrates into but does not stop the function of or significantly reduce the function of the gas diffusion layer. Nothing in Krasij suggests that controlled penetration.

Claim 4 further points out that the hardened adhesive is a cured silicone or epoxy resin. A cured silicone is not referred to in Krasij.

Claim 5 adds that the bipolar plate has been pretreated with a bonding agent in the area of the adhesive, which is not taught by Krasij.

Claim 6 adds to claim 1 that the surface of the gas distribution structure and the surface of the circumferential volume are located flush in one plane. Krasij does not teach or describe those features.

Claim 7 adds to claim 1 in an area of gas conducts, also such volume zones which are defined at the top, exterior and bottom sides by the bipolar plate (1), the gas diffusion layer (4a, 4b) and the membrane (8) and which surround the gas conducts (2a, 2b), are filled with a cured adhesive in a gap-free and gas-tight manner, which is not anticipated by Krasij.

Claim 7 defines the assembly which can be produced by the method of (allowable) claim 14. The Office Action states that Krasij discloses that the adhesive can penetrate into and fill the areas claimed. The assembly described by Krasij, however, does not comprise any gas conducts which penetrate through the bipolar plate, as uniquely defined by the present invention and seen in Figs. 3 and 5 of the present application (2a, 2b). These conducts pass through the thickness of the bipolar plate and are absent in Krasij.

Claim 8 claims the method of producing the product. The free-flowing adhesive is initially applied to the margin of the membrane or the bipolar plate in the form of an adhesive bead higher than the gas diffusion layer. Krasij does not have those steps of forming an adhesive bead. Claim 8 further points out that the volume of the bead is dimensioned so as to completely fill the volume zone, which is not described nor taught by

Krasij. Claim 8 also points out the bringing of the adhesive into shape by assembling the components, which is not found in Krasij.

Claim 9 adds to claim 8 a hydrogen side of the bipolar plate or of the MEA is glued by applying the adhesive to the hydrogen side of the bipolar plate or of the MEA, which is not described in Krasij.

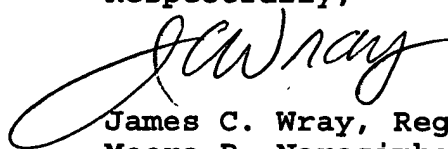
Claim 10 adds to claim 8 the adhesive is allowed to penetrate into the gas diffusion layer by 0.2 mm to 1 mm before curing, which is not taught by Krasij.

Claim 11 adds to claim 8 the curable silicone, and claim 12 adds to claim 8 the pretreatment, which is not anticipated by Krasij.

Nothing in Krasij teaches or suggests the claimed features. Therefore, the reference cannot anticipate nor render obvious the present invention as claimed.

Reconsideration and allowance are respectfully requested.

Respectfully,



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